# KING HILL DOMESTIC WATER AND SEWER (PWS 4200026)
# SOURCE WATER ASSESSMENT FINAL REPORT

**August 26, 2002**

## State of Idaho
## Department of Environmental Quality

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## Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for the King Hill Domestic Water and Sewer, King Hill, Idaho,* describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, i.e. nitrates, arsenic), volatile organic contaminants (VOCs, i.e. petroleum products), synthetic organic contaminants (SOCs, i.e. pesticides), and microbial contaminants (i.e. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

The King Hill Domestic Water and Sewer drinking water system consists of two ground water wells. The wells rate a moderate susceptibility to IOCs, VOCs, SOCs, and microbial contamination except for well # 1, which rates high for IOCs. The potential contaminant sources for the system include a confined animal feeding operation and a landfill. Moderate to high hydrologic sensitivity and moderate system construction ratings also influenced the overall scores.

The two wells are manifolded together and water samples are collected at a common faucet. The IOCs arsenic, fluoride, selenium, and nitrate have been detected, but at levels below the current MCLs as set by the EPA. Total coliform bacteria have never been recorded in the wells, but have been detected in the distribution system on three occasions. Though the drinking water system is not in violation of any current regulations, the King Hill Domestic Water and Sewer should be aware that the potential for contamination still exists.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the King Hill Domestic Water and Sewer, drinking water protection activities should first focus on correcting any deficiencies outlined in the previous sanitary surveys. A sanitary survey is conducted every five years with the purpose of determining the physical condition of a water system’s components and its capacity. No potential contaminants should be allowed within 50 feet of any of the wellheads. Any spills from any of the identified potential contaminant sources should be quickly dealt with, as should any future development within the delineation area. Some of the designated protection areas are outside the direct jurisdiction of the King Hill Domestic Water and Sewer, making collaboration and partnerships with state and local agencies and industry groups critical to the success of drinking water protection. All wells should maintain sanitary standards regarding wellhead protection. Should microbial contamination become a problem, appropriate disinfection practices would need to be implemented.

Partnerships with state and local agencies and industry groups should be established and are critical to success. Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations contain some urban and residential land uses. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there are major transportation corridors through the delineations, the Idaho Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Elmore Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Boise Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

# SOURCE WATER ASSESSMENT FOR
# KING HILL DOMESTIC WATER AND SEWER,
# ELMORE COUNTY, IDAHO

## Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand the results of this assessment.** Maps showing the delineated source water assessment areas and the inventories of significant potential sources of contamination identified within those areas are attached. The lists of significant potential contaminant source categories and their rankings used to develop the assessment are also attached.

### Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

### Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

# Section 2. Conducting the Assessment

## General Description of the Source Water Quality

The public drinking water system for King Hill Domestic Water and Sewer is comprised of two ground water wells that serve approximately 100 people through 34 connections. The wells are located in Elmore County, with locations near the village of King Hill (Figure 1).

IOCs have been detected in the wells but at levels below current MCLs. The IOCs include arsenic, fluoride, nitrate, and selenium. No VOCs or SOCs have been detected in the wells. Total coliform bacteria have been detected on three separate occassions but has been attributed to the distribution system. Arsenic has been detected in the wells at the 9 parts per billion (ppb), which does not exceed the present MCL. However, in October 2001, the EPA lowered the arsenic MCL from 50 ppb to 10 ppb. At the lowered MCL, this public water system would be very close to not meeting the new standard. This public water system should be cognizant of the new standard and that the arsenic in their wells is very close to exceeding the new MCL.

If the arsenic in the well would ever exceed the revised MCL, the system would need to implement engineering controls to monitor and reduce the level of the contaminant in the water system. The EPA plans to provide up to $20 million over the next two years for research and development of more cost-effective technologies to help small systems meet the new MCL (www.epa.gov).

Nitrate values are very low for this system but because of the location of a confined animal feeding operation (CAFO) upgradient of the well sites, it is advisable that nitrate be monitored regularly to determine possible trends of water quality.

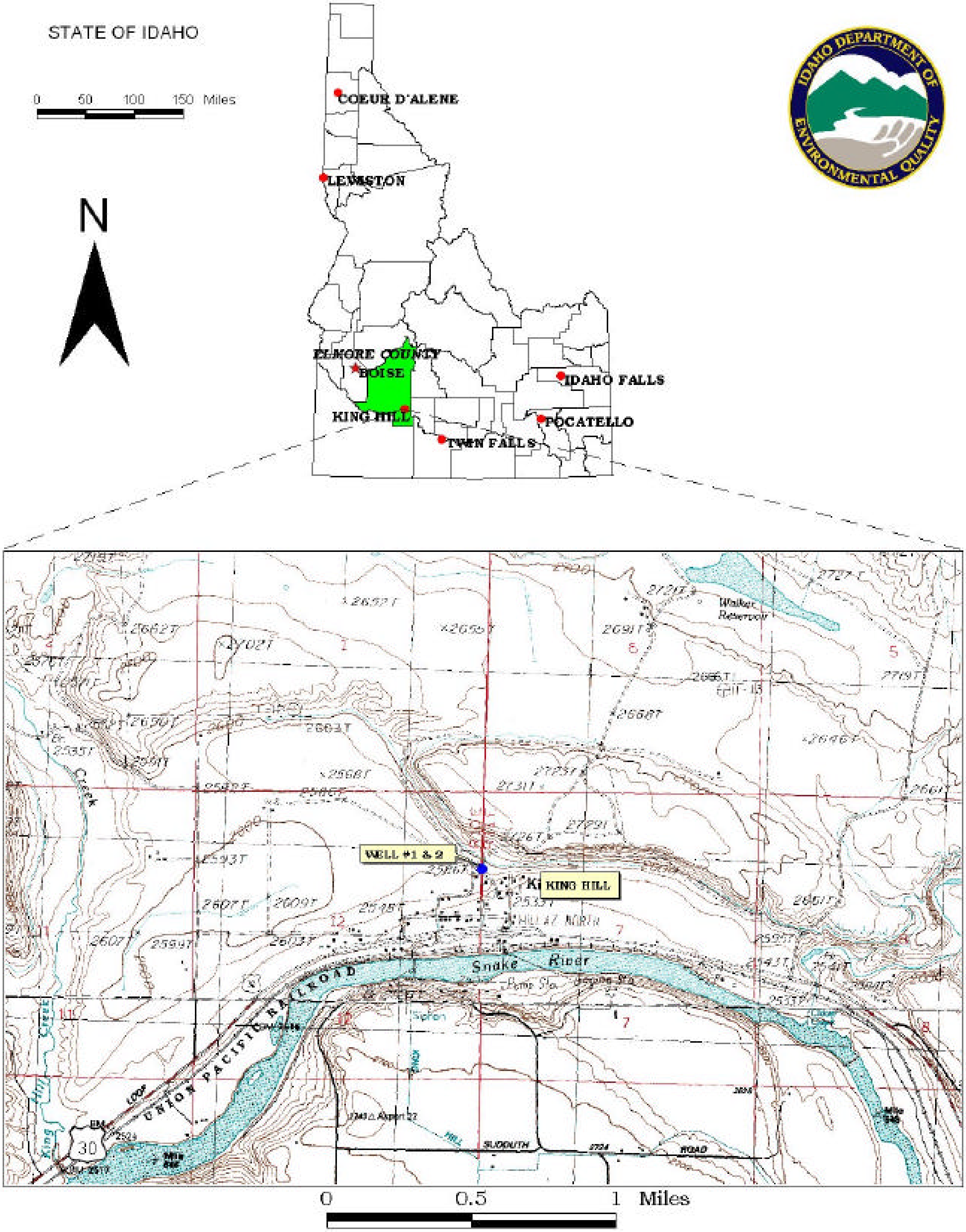
## Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ contracted with BARR Engineering to perform the delineations using a combination of MODFLOW and a refined analytical element computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Mountain Home Plateau aquifer in the vicinity of King Hill Domestic Sewer and Water. The computer models used site specific data, assimilated by BARR Engineering from a variety of sources including the King Hill Domestic Water and Sewer well logs, other local area well logs, and hydrogeologic reports (detailed below).

## Mountain Home Plateau Hydrologic Project Information

The Mountain Home Plateau is a broad, flat plateau, which slopes gently towards the southwest. The plateau is broken by volcanic structures – crater rings, cinder cones, and shield volcanoes. The plateau generally is above 3,000 feet in altitude, except in the extreme western part. All streams draining the plateau are ephemeral, flowing south toward the Snake River. The larger streams draining the Danskin Mountains to the north are fed by springs in the Tertiary volcanics and Cretaceous granites.

***FIGURE 1. Geographic Location of King Hill Domestic Water & Sewer***



Characterized by hot, dry summers and cold winters, the climate of the plateau is semi-arid. Average annual precipitation ranges from nine inches on the plateau to about 23 inches in the mountains (Norton et al., 1982).

The major geologic units in the Mountain Home Plateau from youngest to oldest are: 1) alluvium and younger terrace gravels, 2) Snake River Group, 3) Idaho Group, 4) Idavada Volcanics, and 5) Idaho Batholith. The basalts are considerable thicker in the northern section of the study area. Two of the formations of the Idaho Group, the Glenns Ferry Formation and the Bruneau, are the main aquifer systems (Ralston and Chapman, 1968). The basalts of the Bruneau Formation thin rapidly to the east and to the south. Two parallel northwest trending faults cut through the area. An apparent third fault, trending east from Cinder Cone Butte, bisects one of the northwest faults near Cleft. Several volcanic structures are present on the plateau including Crater Rings, Cinder Cone Butte, and Lockman Butte (Norton et al., 1982). There are two main aquifers in the Mountain Home area: 1) a shallow, perched system beneath Mountain Home and 2) a deeper, regional system.

The perched system underlies approximately 38,000 acres extending from about 10 miles south to 4 miles north of the King Hill Domestic Sewer and Water with a 4 mile width in the area of the City (Young, 1977). For the most part, ground water in the perched system is in the clay, silty, sand, and gravel layers of the Quaternary Alluvium. Depth to water in the shallow system can be less than 10 feet but varies considerable along the limits of the perched system as the water moves vertically down the regional system (Norton et al., 1982). Recharge to the perched system occurs from Rattlesnake and Canyon Creeks as well as seepage from Mountain Home Reservoir and the canals and laterals that distribute the water. Natural discharge from the perched system occurs mainly as downward percolation to the regional system and as spring flow at Rattlesnake Spring near the Snake River Canyon rim. The direction of flow in the perched ground water system is towards the southwest.

The deeper, regional aquifer supplies ground water to the large irrigation wells and municipal wells for Mountain Home and the Air Force base. The major rock types are basalts of the Bruneau Formation, Idaho Group, and poorly consolidated detrital material and minor basalt flows of the Glenns Ferry Formation, Idaho Group. Well yields from the basalts of the Bruneau Formation range from 10 to 3500 gallons per minute (gpm). The range of the well yields for the Glenns Ferry Formation is 3 to 350 gpm. The Bruneau Formation thins rapidly towards the east where the Glenns Ferry Formation becomes the major source of ground water (Norton et al., 1982).

The Glenns Ferry Formation, a thick intertongueing deposit of lake and stream sediments, is the primary aquifer in the eastern portion of the area. Due to the fine-grained nature of the sediments, the permeability and yield to wells is generally low. The formation is composed of tan, gray, and white clay, silt, and fine to medium sand (Ralston and Chapman, 1968). The formation has been noted as being 2000 feet thick near Glenns Ferry (Malde and Powers, 1962).

The sediments and basalt of the Bruneau Formation are the primary aquifers in the Mountain Home area. The jointing, fracturing, and vesicular character of the basalts cause them to be very permeable. The majority of ground water withdrawal from the formation is from deeper interflow zones and a thin but extensive series of sand beds just below the lower basalt unit. The unit has approximately 1500 feet of lake and stream sediments with numerous basalt interbeds. The basalts tend to be dark gray to black when fresh but weather to a reddish gray-brown color. Most of the interflow zones contain large quantities of glassy cinders and some ash (Ralston and Chapman, 1968).

Ralston and Chapman (1968 and 1970) found that recharge to the ground water system in the eastern potion of the Mountain Home Plateau is limited due to low amounts of precipitation, relatively impermeable material in the area of most precipitation, and high evapotranspiration rates.  Recharge to the regional system occurs as downward percolation of precipitation that falls on the mountains, losses from intermittent stream flows, and from downward percolation from the perched system.  Discharge from the regional system occurs as spring flow, underflow to the Snake River, and pumpage.

In general, the direction of ground water flow is towards the southwest with a southern component in the southeast and a western component in the northwest.  Low permeability along the apparent east-west trending fault through Cleft limits the flow to the north.  The ground water elevation is 70 to 165 feet higher on the south side of the fault (Norton et al., 1982).

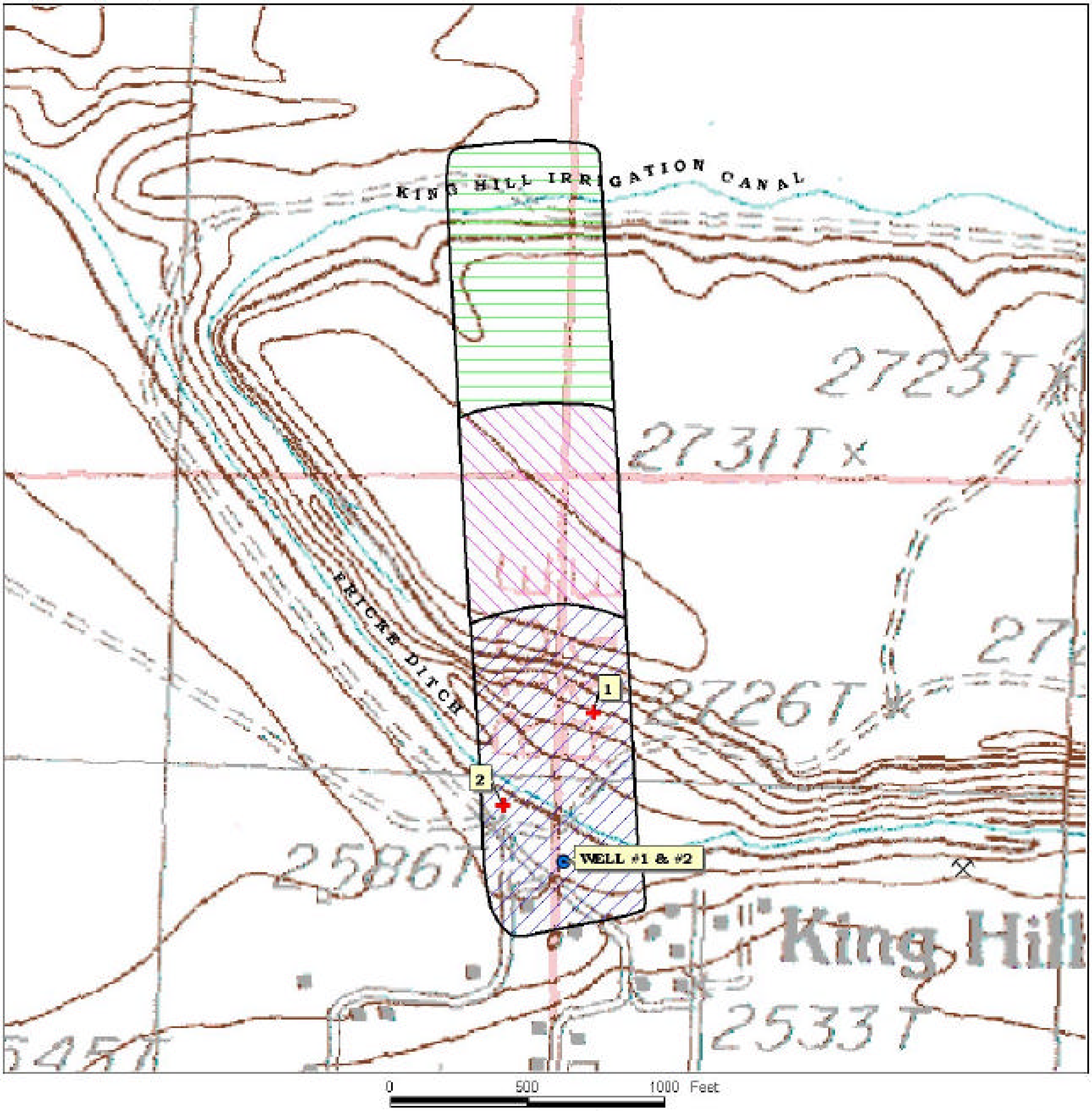
The delineated source water assessment areas for the King Hill Domestic Water and Sewer can best be described as a north trending corridor approximately 1 mile long and 0.25 mile wide (Figure 2). The actual data used by BARR Engineering in determining the source water assessment delineation areas are available from DEQ upon request.

**Identifying Potential Sources of Contamination**

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources.  The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination.  The locations of potential sources of contamination within the delineation areas were obtained from Geographic Information Systems (GIS) databases compiled in 1998 and 1999 as well as the enhanced done by the operator.  Land use within the immediate area of the King Hill Domestic Sewer and Water wellheads consists of irrigated agriculture and animal feeding operation, an old city landfill and surface water canals.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices.  Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release.  Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation.  What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation.  There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials.  Many owners of such facilities may not even be aware that they are located near a public water supply well.

***FIGURE 2. King Hill Domestic Water & Sewer Delineation Map and Potential Contaminant Source Locations***





**PWS# 4200026**
**WELL #1 & #2**

### Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in March and April 2002. The first phase involved identifying and documenting potential contaminant sources within the King Hill Domestic Water and Sewer source water assessment areas (Figures 2) through the use of computer databases and Geographic Information System maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the area.

The delineated source water areas for the wells contain an animal feeding operation and an old community landfill. Also included are two surface water canals. The potential contaminant sources associated with the wells are detailed in Table 1.

**Table 1. King Hill Domestic Water and Sewer Well #1, Potential Contaminant Inventory**

| SITE # | Source Description | TOT Zone[2] (years) | Source of Information | Potential Contaminants[3] |
|---|---|---|---|---|
| 1 | CAFO[1] | 0-3 | Enhanced Inventory | IOC,VOC,SOC, M |
| 2 | Old Community Landfill | 0-3 | Enhanced Inventory | IOC,VOC,SOC, M |
| | Irrigation Canal | 0-3 | GIS Map | IOC,VOC,SOC, M |
| | Irrigation Canal | 6-10 | GIS Map | IOC,VOC,SOC |

**[1]CAFO = Confined Animal Feeding Operation**
**[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead**
**[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical, M = microbials**

## Section 3. Susceptibility Analyses

The susceptibility to contamination for each well was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the well is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

### Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of fine-grained geologic material above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel.

Hydrologic sensitivity is moderate for well # 1 and high for well # 2 (Table 2). The difference in the score from well # 1 to well # 2 is attributed to the composition of the vadose zone as unconsolidated material and the lack of an aquitard to impede the downward movement of water into the aquifer. Regional soil data indicate the dominance of moderate to well drained soils in the area of the delineation.

**Well Construction**

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

A sanitary survey was conducted in 2002. Information from that survey and other information indicate that the all of the wells rate moderate susceptibility for system construction. Although the wells do not meet current IDWR construction standards due to casing thickness, the wells have maintained surface seals, are outside of the 100-year flood plain, and are constructed in a way to protect against surface flooding.

Though the wells may have been in compliance with standards when they were completed, current PWS well construction standards are more stringent. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Some of the regulations deal with screening requirements, aquifer pump tests, and thickness of casing. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells.

Well # 1 (drilled in 1990) has 78 feet of 6-inch casing installed. The hole was drilled to a depth of 120 feet. The static water level is listed at 80 feet below ground surface (bgs). The surface seal extended the entire length of the casing. The well casing thickness is listed as 0.250 inches on the well log. The well does not comply with current casing thickness requirements. Therefore, the well was assessed an additional point in the system construction rating and providing for the moderate scoring for the well in system construction.

Well # 2 (drilled in 1990) has 98 feet of 6-inch casing installed. The hole was drilled to a total depth of 140 feet. The static water level is listed at 84 feet bgs. The well casing thickness is listed on the well log as 0.250 inches. Therefore, the well was assessed an additional point in the system construction rating and providing for the moderate scoring for the well in system construction.

**Potential Contaminant Source and Land Use**

Well # 1 has a moderate land use score for IOCs (i.e. nitrates), VOCs (i.e. petroleum products), and SOCs (i.e. pesticides) and low for microbial contaminants (i.e. bacteria). Well # 2 has a moderate land use score for IOCs, VOCs, SOCs, and low for microbial. The potential contaminant sources for this system are four for each well (Table 1). All sources have the potential to cause contamination to the aquifer if a spill occurred. The area in the delineation is predominately agriculture and has a high potential for leachability to the ground water from agricultural related activities.

**Final Susceptibility Ranking**

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, storing potential contaminant sources within 50 feet of a wellhead will automatically lead to a high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. In terms of total susceptibility, all wells rate moderate susceptibility risk for all categories, except for well # 1 IOCs, which rated high because of the potential of leachability from agricultural lands.

**Table 2. Summary of King Hill Domestic Water and Sewer, Susceptibility Evaluation**

| Well | Susceptibility Scores[1] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Hydrologic Sensitivity | Contaminant Inventory | | | | System Construction | Final Susceptibility Ranking | | | |
| | | IOC | VOC | SOC | Microbials | | IOC | VOC | SOC | Microbials |
| Well # 1 | H | M | M | M | L | M | H | M | M | M |
| Well # 2 | M | M | M | M | L | M | M | M | M | M |

**M = Moderate Susceptibility, L = Low Susceptibility, IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**

**Susceptibility Summary**

All wells rate moderate for susceptibility risk for all categories. There have also been detections in the tested well water of the IOCs arsenic, fluoride, selenium and nitrate at levels below the current MCLs. Arsenic has been detected at levels (9 ppb ) below the new 10 ppb MCL established by the EPA. Total coliform has been detected in the distribution system but never in the well. If any contaminants are detected in the source water exceed the established MCL, the King Hill Domestic Water and Sewer should take measures to reduce the level of the contaminant.

## Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a well receives, protection is always important. Whether the well is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For King Hill Domestic Water and Sewer, drinking water protection activities should first focus on correcting any deficiencies outlined in the 1995 sanitary survey. Additionally, there should be a focus on implementation of practices aimed at reducing the leaching of urban related contaminants within the designated source water area. No potential contaminants are allowed within 50 feet of any of the wellheads (IDAPA 58.01.08.550). Although the potential contaminant sources for these sites are not numerous, they have the potential to cause considerable damage to the aquifer because of the geological and hydrogeological properties present in the delineations. The potential for MCL exceedences of nitrate from the new CAFO site near the well should be evaluated regularly. Water quality samples should be taken with the levels recorded over time to establish a baseline level for the region. Any spills from any of the potential contaminant sources should be quickly dealt with, as should any future development within the delineation areas. Much of the designated protection area is outside the direct jurisdiction of King Hill Domestic Water and Sewer, making collaboration and partnerships with state and local agencies and industry groups critical to the success of drinking water protection. All wells should maintain sanitary standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations contain large urban land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there are many transportation corridors through the delineations, the Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Elmore Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Boise Regional Office of the DEQ or the Idaho Rural Water Association.

**Assistance**

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

| | |
|---|---|
| Boise Regional DEQ Office | (208) 373-0550 |
| State DEQ Office | (208) 373-0502 |

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper, Idaho Rural Water Association, at (208) 343-7001 (mharper@idahoruralwater.com) for assistance with drinking water protection (formerly wellhead protection) strategies.

# POTENTIAL CONTAMINANT INVENTORY
# LIST OF ACRONYMS AND DEFINITIONS

**AST (Aboveground Storage Tanks) –** Sites with aboveground storage tanks.

**Business Mailing List –** This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

**CERCLIS –** This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund@ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

**Cyanide Site –** DEQ permitted and known historical sites/facilities using cyanide.

**Dairy –** Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

**Deep Injection Well –** Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

**Enhanced Inventory** – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

**Floodplain –** This is a coverage of the 100year floodplains.

**Group 1 Sites –** These are sites that show elevated levels of contaminants and are not within the priority one areas.

**Inorganic Priority Area –** Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

**Landfill –** Areas of open and closed municipal and non-municipal landfills.

**LUST (Leaking Underground Storage Tank)** – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

**Mines and Quarries** – Mines and quarries permitted through the Idaho Department of Lands.)

**Nitrate Priority Area –** Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

**NPDES (National Pollutant Discharge Elimination System) –** Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

**Organic Priority Areas –** These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

**Recharge Point –** This includes active, proposed, and possible recharge sites on the Snake River Plain.

**RICRIS –** Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

**SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) –** These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

**Toxic Release Inventory (TRI) –** The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

**UST (Underground Storage Tank) –** Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

**Wastewater Land Applications Sites** – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

**Wellheads –** These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

**NOTE:** Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

## References Cited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# Attachment A

# King Hill Domestic Water and Sewer
# Susceptibility Analysis
# Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report    Public Water System Name : KING HILL DOMESTIC WATER AND SEWER    Well# : WELL #1

Public Water System Number 4200026    5/31/02 2:25:01 PM

| 1. System Construction | | SCORE | | | |
|---|---|---|---|---|---|
| Drill Date | 8/23/90 | | | | |
| Driller Log Available | YES | | | | |
| Sanitary Survey (if yes, indicate date of last survey) | YES | 2002 | | | |
| Well meets IDWR construction standards | NO | 1 | | | |
| Wellhead and surface seal maintained | YES | 0 | | | |
| Casing and annular seal extend to low permeability unit | YES | 0 | | | |
| Highest production 100 feet below static water level | NO | 1 | | | |
| Well located outside the 100 year flood plain | NO | 1 | | | |
| Total System Construction Score | | 3 | | | |
| **2. Hydrologic Sensitivity** | | | | | |
| Soils are poorly to moderately drained | NO | 2 | | | |
| Vadose zone composed of gravel, fractured rock or unknown | YES | 1 | | | |
| Depth to first water > 300 feet | NO | 1 | | | |
| Aquitard present with > 50 feet cumulative thickness | NO | 2 | | | |
| Total Hydrologic Score | | 6 | | | |
| **3. Potential Contaminant / Land Use - ZONE 1A** | | IOC Score | VOC Score | SOC Score | Microbial Score |
| Land Use Zone 1A | IRRIGATED PASTURE | 1 | 1 | 1 | 1 |
| Farm chemical use high | YES | 2 | 0 | 2 | |
| IOC, VOC, SOC, or Microbial sources in Zone 1A | NO | NO | NO | NO | NO |
| Total Potential Contaminant Source/Land Use Score - Zone 1A | | 3 | 1 | 3 | 1 |
| **Potential Contaminant / Land Use - ZONE 1B** | | | | | |
| Contaminant sources present (Number of Sources) | YES | 3 | 3 | 3 | 3 |
| (Score = # Sources X 2 ) 8 Points Maximum | | 6 | 6 | 6 | 6 |
| Sources of Class II or III leacheable contaminants or | YES | 4 | 2 | 2 | |
| 4 Points Maximum | | 4 | 2 | 2 | |
| Zone 1B contains or intercepts a Group 1 Area | NO | 0 | 0 | 0 | 0 |
| Land use Zone 1B | 25 to 50% Irrigated Agricultural Land | 2 | 2 | 2 | 2 |
| Total Potential Contaminant Source / Land Use Score - Zone 1B | | 12 | 10 | 10 | 8 |
| **Potential Contaminant / Land Use - ZONE II** | | | | | |
| Contaminant Sources Present | NO | 0 | 0 | 0 | |
| Sources of Class II or III leacheable contaminants or | Yes | 1 | 0 | 0 | |
| Land Use Zone II | 25 to 50% Irrigated Agricultural Land | 1 | 1 | 1 | |
| Potential Contaminant Source / Land Use Score - Zone II | | 2 | 1 | 1 | 0 |
| **Potential Contaminant / Land Use - ZONE III** | | | | | |
| Contaminant Source Present | YES | 1 | 1 | 1 | |
| Sources of Class II or III leacheable contaminants or | YES | 1 | 1 | 1 | |
| Is there irrigated agricultural lands that occupy > 50% of | NO | 0 | 0 | 0 | |
| Total Potential Contaminant Source / Land Use Score - Zone III | | 2 | 2 | 2 | 0 |
| Cumulative Potential Contaminant / Land Use Score | | 19 | 14 | 16 | 9 |
| **4. Final Susceptibility Source Score** | | 13 | 12 | 12 | 12 |
| **5. Final Well Ranking** | | High | Moderate | Moderate | Moderate |

Ground Water Susceptibility Report    Public Water System Name : KING HILL DOMESTIC WATER AND SEWER    Well# : WELL #2

Public Water System Number 4200026    5/31/02 2:51:45 PM

## 1. System Construction

| | | SCORE |
|---|---|---|
| Drill Date | 8/22/90 | |
| Driller Log Available | YES | |
| Sanitary Survey (if yes, indicate date of last survey) | YES | 2002 |
| Well meets IDWR construction standards | NO | 1 |
| Wellhead and surface seal maintained | YES | 0 |
| Casing and annular seal extend to low permeability unit | YES | 0 |
| Highest production 100 feet below static water level | NO | 1 |
| Well located outside the 100 year flood plain | NO | 1 |
| | Total System Construction Score | 3 |

## 2. Hydrologic Sensitivity

| | | |
|---|---|---|
| Soils are poorly to moderately drained | NO | 2 |
| Vadose zone composed of gravel, fractured rock or unknown | NO | 0 |
| Depth to first water > 300 feet | NO | 1 |
| Aquitard present with > 50 feet cumulative thickness | YES | 0 |
| | Total Hydrologic Score | 3 |

## 3. Potential Contaminant / Land Use - ZONE 1A

| | | IOC Score | VOC Score | SOC Score | Microbial Score |
|---|---|---|---|---|---|
| Land Use Zone 1A | IRRIGATED PASTURE | 1 | 1 | 1 | 1 |
| Farm chemical use high | YES | 2 | 0 | 2 | |
| IOC, VOC, SOC, or Microbial sources in Zone 1A | NO | NO | NO | NO | NO |
| Total Potential Contaminant Source/Land Use Score - Zone 1A | | 3 | 1 | 3 | 1 |

### Potential Contaminant / Land Use - ZONE 1B

| | | IOC Score | VOC Score | SOC Score | Microbial Score |
|---|---|---|---|---|---|
| Contaminant sources present (Number of Sources) | YES | 3 | 3 | 3 | 3 |
| (Score = # Sources X 2 ) 8 Points Maximum | | 6 | 6 | 6 | 6 |
| Sources of Class II or III leacheable contaminants or | YES | 4 | 2 | 2 | |
| 4 Points Maximum | | 4 | 2 | 2 | |
| Zone 1B contains or intercepts a Group 1 Area | NO | 0 | 0 | 0 | 0 |
| Land use Zone 1B | 25 to 50% Irrigated Agricultural Land | 2 | 2 | 2 | 2 |
| Total Potential Contaminant Source / Land Use Score - Zone 1B | | 12 | 10 | 10 | 8 |

### Potential Contaminant / Land Use - ZONE II

| | | IOC Score | VOC Score | SOC Score | Microbial Score |
|---|---|---|---|---|---|
| Contaminant Sources Present | NO | 0 | 0 | 0 | |
| Sources of Class II or III leacheable contaminants or | YES | 1 | 0 | 0 | |
| Land Use Zone II | 25 to 50% Irrigated Agricultural Land | 1 | 1 | 1 | |
| Potential Contaminant Source / Land Use Score - Zone II | | 2 | 1 | 1 | 0 |

### Potential Contaminant / Land Use - ZONE III

| | | IOC Score | VOC Score | SOC Score | Microbial Score |
|---|---|---|---|---|---|
| Contaminant Source Present | YES | 1 | 1 | 1 | |
| Sources of Class II or III leacheable contaminants or | YES | 1 | 1 | 1 | |
| Is there irrigated agricultural lands that occupy > 50% of | NO | 0 | 0 | 0 | |
| Total Potential Contaminant Source / Land Use Score - Zone III | | 2 | 2 | 2 | 0 |

| | IOC Score | VOC Score | SOC Score | Microbial Score |
|---|---|---|---|---|
| Cumulative Potential Contaminant / Land Use Score | 19 | 14 | 16 | 9 |
| 4. Final Susceptibility Source Score | 10 | 9 | 9 | 9 |
| 5. Final Well Ranking | Moderate | Moderate | Moderate | Moderate |